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Appendix H

Woodlawn ARC Commissioning - Outline Plan

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Purpose	The purpose of this Outline Plan is to describe the process of commissioning the Energy Recovery Facility (ERF) (Facility) at the Woodlawn Advanced Energy Recovery Centre (Woodlawn ARC), from the point of construction completion to the point at which the Facility is handed over to operations.

Scope	This Outline Plan is preliminary and applies to the Woodlawn ARC project only.
Review Frequency	N/A

Contents

Revision History

Revised By	Revision	Date	Reviewed By	Approved By	Date
LN	A	18/01/22	AR, TR	CL	25/01/22
LN	B	04/03/22	AR, TR	CL	09/03/22
LN	C	10/08/22	AR	CL	16/08/22

1. General

Prior to the commencement of operations of the Woodlawn Advanced Energy Recovery Centre (ARC), Veolia proposes to demonstrate that the Energy Recovery Facility (hereafter referred to as the "Facility") will be fit for purpose and compliant with planning instruments and environment licences (hereafter referred to as the "Approvals") by proving, via a commissioning process, the:

- Capacity (demonstrated processing capacity);
- Emissions (demonstrated environmental compliance); and
- Specification (demonstrated capability).

The commissioning process will ensure that planning, documenting, scheduling, testing, adjusting and verifying will assure that the technology and process has been designed and installed to operate as intended and will achieve Veolia's legislative and regulatory obligations under the Approvals.

The Facility will be commissioned by Veolia's Engineering, Procurement, Construction (EPC) contractor in close consultation with Veolia's own experienced commissioning team, following the approved commissioning plan.

Commissioning will be conducted in compliance with the Environment Protection Licence.

2. Commissioning Program

The commissioning phase is the final step of the construction phase, and is expected to commence two years after site establishment. The sequence of the commissioning process is illustrated in Figure 2-1, and includes the following key commissioning stages:

- Construction Completion: Construction of the Facility is substantially complete and it is safe to commence pre-commissioning testing of equipment
- Pre-commissioning Testing
- Commissioning Testing
- Threshold Performance Testing
- Reliability Testing
- Guaranteed Performance Testing
- Availability Test (8,000 hours)
- Issuing of Acceptance Certificate.

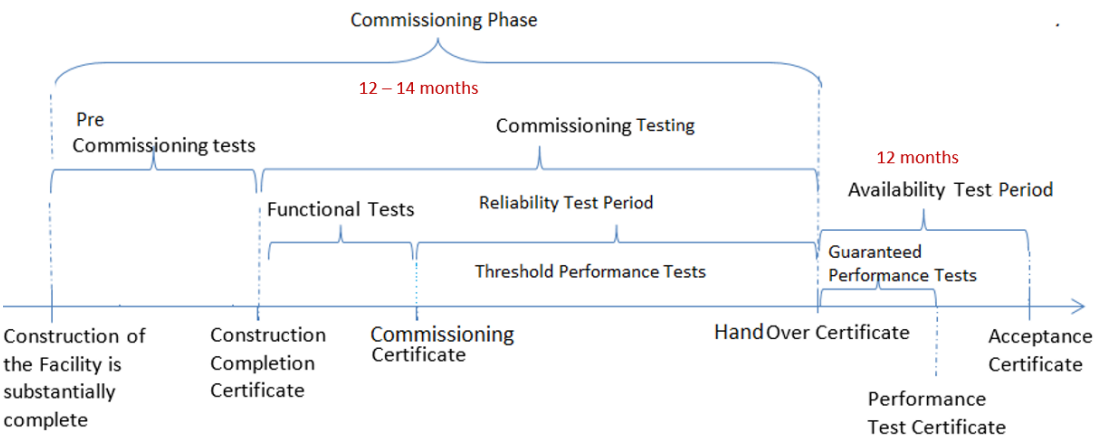

Figure 2-1: Sequence of Commissioning Tests

Further details of each stage are provided in Section 3.

3. Details of Key Commissioning Stages

3.1. Construction Completion

The construction completion report requirements for the EPC contractor to deliver will be:

- As-built engineering documents; and
- Works completion check-lists, including results of civil works compliance inspections and building pre-occupancy checks.

In order to achieve Construction Completion, all construction tasks and activities deemed critical for safe commissioning must be complete and validated.

3.2. Pre-Commissioning Testing

Pre-commissioning tests will be completed prior to any waste being delivered to the Facility for the commencement of the commissioning testing activities. The test process will include:

- Equipment checks;
- Electrical and controls tests; and
- Readiness tests.

Once the Facility systems have been tested individually, the final readiness test is to operate the systems concurrently to ensure all ancillary services, such as compressed air, are capable of supplying the total plant demand. Subject to successful pre-commissioning testing, the Facility will be ready for commissioning with waste.

Upon the completion of pre-commissioning testing, the EPC Contractor will be issued a Construction Completion Certificate which is a prerequisite to the commencement of Commissioning Testing.

3.3. Commissioning Testing

Prior to commencement of commissioning, Veolia will ensure all necessary systems to support the safe and efficient commissioning and operation of the Facility are in place.

Commissioning Testing will comprise all further cold and hot work required to bring the Facility into a state of readiness for the Threshold Performance Tests and Reliability Tests to commence.

The Commissioning Tests will include a series of predetermined Functional Tests to demonstrate the controlled startup, shutdown and operation of key processes in the Facility, and that the Facility is able to maintain compliance with the Approvals, even in emergency situations (such as a power outage). The Facility operating parameters, including emissions to the atmosphere, will be monitored and recorded during this period to ensure that process control is maintained and that the Facility can comply with the Approvals during continuous operation and load changes.

3.3.1. Threshold Performance Testing and Reliability Testing

At the conclusion of Commissioning, a Reliability Test Period will be undertaken where the Facility will undergo a series of Threshold Performance Tests to prove the plant is capable of sustainable operations to 90% of the Guaranteed Performance Requirements.

These tests will demonstrate that the Facility is able to:

- Successfully meet the requirements of the various performance tests as defined in the Facility

Guaranteed Performance Requirements at 90% of the Maximum Continuous Rating (MCR) of the Facility.

- Comply with requirements of the Approvals at all times, including the:
    - Combustion conditions as demonstrated by the Facility instrumentation and control system data and/or by extractive test sampling and analysis by an appropriately accredited independent laboratory; and
    - Emissions values as demonstrated by the onsite monitoring equipment including the Facility Continuous Emissions Monitoring System (CEMS) and by extractive test sampling and analysis by an appropriately accredited independent laboratory.

During the course of the Threshold Performance Test and Guaranteed Performance Test the air emission monitoring frequency will comply with the following standards:

- Continuous measurements will be logged by the distributed control system to obtain 10 minute, hourly and daily averages for the complete duration of the Performance Guarantee Test.
- The monitoring instrumentation will be calibrated at the beginning and checked once a week by grid measurements at inlet and outlet of the stack using accredited sampling methods in accordance with relevant standards.
    - The sampling will be carried out over a period of not less than four hours of steady state conditions with the ARC operating at MCR. Each sample will be date and time stamped so that the resulting values can be correlated with instrument recorded values.
    - The parameters relating to heavy metals and organic species will be measured once a week by grid measurements receiving double samples using accredited methods accepted by the New South Wales EPA.
- A certified stack emissions testing company whose identity will be defined in the Commissioning and Testing Plan will be used for the validation of stack emissions measurements.
- The reference values obtained by the stack emissions testing company must not differ by more than +/-10% from the values obtained from the CEMS.

The IBA will be sampled to ensure the unburnt matter in the bottom ash is less than 3% as total organic carbon (TOC) and 5% as loss on ignition (LOI), measured as dry weight. During the Threshold Performance Test, these samples will be taken over three separate 8 hour test periods in accordance with FDBR- Guideline RL 7 Acceptance Testing of Waste Incineration Plants with Grate Firings Systems, Edition 03/2013. The resulting analysis will be completed in accordance with EN 13137 and EN 1744-7.

Following completion of the Threshold Performance Testing and Reliability Testing, and prior to proceeding to the Availability Test Period, Veolia will inspect the Facility to ensure that there are no items that could prevent the Facility from functioning legally or safely and in compliance with good operating practice and the terms of the Approvals. If satisfied with the Facility, Veolia will issue the EPC Contractor with a Handover Certificate, and Veolia will formally take over operations of the Facility.

3.4. Availability Test Period

Following completion of the Reliability Test, the Facility will undergo proof of performance, “Guaranteed Performance Testing”, with a 365 day Availability Test Period used to prove the Facility’s ability to meet the Performance Test Requirements during long term operations.

3.4.1. Guaranteed Performance Testing

The steam and power output under differing operating conditions, as well as the consumption rates of fuel, water, power, chemicals and all other consumables will be determined.

The Guaranteed Performance Test will follow the test methodologies given in FDBR-Guideline RL 7 Acceptance Testing of Waste Incineration Plants with Grate Firings Systems, Edition 03/2013 for the combustion plant, and

AS 60034.22 (2010) for the turbine generator.

A principal element of the Guaranteed Performance Testing will be the demonstration of compliance with the Approvals. A CEMS, which will have been commissioned and tested as part of the Threshold Performance Tests, will be used to facilitate monitoring of, and ensure compliance with, emission limits. Refer to Section 3.3.1 for details of calibration, sampling and verification of the emissions monitoring equipment.

During the Guaranteed Performance Test, the IBA will continue to be sampled in a similar manner to the Threshold Performance Tests to ensure the unburnt matter in the bottom ash is less than 3% as total organic carbon (TOC) and 5% as loss on ignition (LOI), measured as dry weight.

Noise emissions will also be monitored during the Guaranteed Performance Testing to demonstrate that the noise levels are in compliance with the Approvals. The monitoring points will include:

- Maximum sound pressure level measured within the turbine hall but outside the acoustic enclosure of the STG shaft,
- Maximum sound pressure level measured at 1 m distant from any item of fixed plant other than the STG. For the avoidance of doubt for any equipment placed in a separate enclosure noise measurement will be made outside of the enclosure,
- Averaged sound pressure level in administration and office areas, including the central control room,
- LAeq,15min noise contribution at R1, R3, R4, R5 locations with plant in operation,
- LAeq,15min noise contribution at the R2 Cowley Hills with plant in operation, and
- LAeq,15min noise contribution at the IN6 location with the plant in operation.

The Guaranteed Performance Test will verify that the quantity and quality of the APCr and stabilised APCr generated by the Facility is consistent with the findings outlined in the Ash Management Study (Appendix E).

3.4.2. Availability Testing

In addition to the prescribed Guaranteed Performance Tests, the EPC Contractor will carry out the following Availability Tests on the following equipment over an agreed upon time frame (usually set at 8,000 operating hours):

- The boiler and the furnace;
- The steam turbine generator; and
- The flue gas treatment system.

3.5. Acceptance Certificate

Once the Facility has passed all the Guaranteed Performance Tests including the Availability Test, Veolia will issue an Acceptance Certificate verifying that the Facility has met the Guaranteed Performance and Availability Testing requirements. The issue of the Acceptance Certificate represents the completion of the Commissioning Phase and Availability Test Period.